Using Problem-based Learning to Enhance Team and Player Development in Youth Soccer

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By using strategies such as critical thinking, goal setting, and peer coaching, problem-based learning addresses a variety of learning styles.

In response to the demand for quality programming in youth soccer, team and player development initiatives have become fast-growing enterprises across Canada. With this development comes questions regarding the role of sport pedagogy within these programs. Recent advances in sport pedagogy have made a significant contribution to games education (Hopper & Bell, 2000; Mandigo & Holt, 2000; Mitchell, Oslin, & Griffin, 1995; Rink, 2002; Werner, Bunker & Thorpe, 1996). One of these advances is problem-based learning (PBL), which has the potential to meet the diverse needs of players on a youth soccer team by incorporating a wide range of learning strategies in a unique inquiry- and context-based approach to team and player development. Problem-based learning is a coaching and teaching methodology that develops knowledge, abilities, and skills through participation; collaborative investigation; and the resolution of authentic, “ill-structured” problems through the use of problem definition, teamwork, communication, data collection, decision-making, planning and goal-setting, active performance, and reflective analysis (Altrichter, Posch & Somekh, 1993; Clarke & Hubball, 2001; Gallagher, 1997; Stepien & Pike, 1997). Ill-structured problems are those that occur naturally in dynamic, team-game situations where there are complex processes, concepts, or issues to understand, and strategies or skills to master (e.g., principles of attack and defense, set-pieces, positional formations and team-plays, non-ball/ball-carrier options, discerning relevant versus non-relevant cues in the performance environment).

This methodology has been effective in enhancing critical thinking, communication, and problem-solving skills in a variety of field and classroom settings (Torp & Sage, 1998; Wilkerson & Gijse-laers, 1996). However, very little has been documented regarding the use of PBL in youth sports and physical education environments, even though its principles and strategies are adaptable to a wide range of community youth-sport programs and physical education games. This article is based on research and on the PBL experiences of a youth soccer academy team at the University of British Columbia (Hubball, 2001b, 2002).

Problem-based Learning Approaches to Team and Player Development

The pedagogical roots of PBL lie in constructivism and context-based learning (Boyce, Van Tassel-Baska, Burrell, Sher & Johnson, 1997; Brown, Collins & Duguid, 1989; Cobb & Bowers, 1999; Fosnot, 1996; Hansman, 2001; Lave & Wenger, 1991). The benefits of learning from experience and collaboration are familiar concepts in the education literature. Dewey (1916), for example, argued that when individuals participate or share in a social learning environment, the environment serves to reinforce the purpose of the activity. In addition, people become familiar with the activity's methods and subject
matter, they acquire needed skills, and they are saturated with its emotional spirit (p. 26).

Problem-based learning provides a unique and multifaceted approach to team and player development because it focuses learning on the interactions with teammates in a learning community and it incorporates the players’ developmental needs, ideas, and sporting context into the learning experience. Furthermore, the game setting provides cues that are critical to cognitive processing (Hansman 2001; Lave, 1996; Lave & Wenger, 1991; Vygotsky, 1978, 1999; Wenger, 1998). Complementary to contemporary cognitive, tactical, and teaching games for understanding (TGFU) approaches (Grehaigne, Godbout, & Bouthier, 1999; Hopper & Bell, 2000; Turner, 1999; Werner, Bunker & Thorpe, 1996), PBL focuses players’ training and competition on developing critical understanding and effective responses to the dynamics of complex game situations (e.g., offensive and defensive strategies, tactical team play, set-pieces, individual ball skills). Thus, players are expected to take an active role in the team- and player-development process and think like coaches, while still enjoying the intrinsic benefits of learning experientially through game play.

Problem-based learning draws upon a wide range of learning strategies, including critical thinking, interpersonal communications, reflective analysis, goal-setting, cooperative learning, learning by doing, and problem-solving. The method also relies on diverse abilities from individual players, much like that of an effective sports team. The range of learning strategies inherent in PBL increases the likelihood of meeting diverse learning styles among players, while providing a balance of both preferred and challenging experiences for each player, thus enabling individuals to develop a broad set of knowledge, abilities, and skills (Gardner, 1993; Kolb, 1984). In a sports team environment, PBL is thus viewed as an individual and social contextual process. Therefore, to facilitate PBL in a youth sports program, coaches must shape a positive and responsive learning environment with appropriate activities and utilize their own expertise to guide players in making key decisions regarding strategies to enhance team and player development (Hubball & Robertson, 2003).

Facilitating PBL in Youth Soccer
Coaches should tailor PBL activities to the specific needs of the team and player development context (e.g., school program, community youth soccer, soccer academy program). Thus, coaches should first conduct an assessment of the team and individual players’ abilities, goals, training, and performance. This analysis can be achieved in various ways. Coaches should identify players’ motives for participation, record their observations of players’ strengths and weaknesses during small-sided game play, and require individual players (assisted by parents when possible) to self-assess their soccer goals, strengths, and weaknesses using a one-to-ten scale pertaining to a range of soccer skills. Next, coaches should introduce and prepare players and parents for PBL processes and expectations. The youth soccer academy program for fifth-grade players applied PBL to the following three distinct, yet interrelated activities.

1. **Small-sided competitive games.** These games require players to provide input regarding initial game planning (e.g., communicate specific roles, teamwork, offensive and defensive strategies), periodic performance analysis (e.g., identify strengths and weaknesses of general and specific team plays/skills), and specific goals for further improvements (e.g., more calling for the ball and off-the-ball movement into space, practice first-touch ball-control skills, attend to speed and penetration in offense). Small-sided games on modified fields are an ideal practice and competitive forum for PBL. Small-sided games offer more intense play, more touches with the ball, and a less complex example for players to analyze.

2. **Peer-coaching modules.** These provide periodic opportunities for players to conduct team and player observations, using performance-analysis worksheets during training and competition. Figure 1 gives an example of a worksheet that a player would complete while observing and tracking another individual who participated in a four-on-four practice game. Peer-coaching opportunities, ranging from simple to complex observation and feedback roles, help encourage players to think like coaches, gather relevant data, and analyze game situations and skill execution from a different
DURATION OF OBSERVATION: 10 minutes (4v4 game)
Use tally marks to record the following

**Off-the-ball Activity**
- Number of times that the player is in a good position to receive the ball
- Number of times that the player calls and is in a good position to receive the ball
- Number of times that the player calls and is in a poor position to receive the ball
- Number of times that the player is in a good position to support the defense
- Number of times that the player is in a good position to support an offensive move

**On-the-ball Activity**
- **Defending**: Number of times that the player challenges the ball from an opponent
- **Ball control**: Number of times the player has a good first touch to control the ball
- **Passing**: Number of times that the player makes a quality pass to a teammate
- **Dribbling**: Number of times that the player dribbles effectively for two or more meters
- **Shooting**: Number of times that the player shoots for a goal or has a good shot on target

**Identify Strengths and Areas for Improvement**

3. **Analysis of match-day video footage and development of soccer portfolios.** With guidance, parent volunteers in youth soccer can assist by shooting valuable video footage of team performances during practice sessions or competition. Coaches then select brief clips for analysis and show the footage two or three times to the team for the purpose of analysis. The analysis is conducted collectively through question-answer and discussion formats, as well as individually through homework sheets. Similar sessions analyzing professional team performances offer a useful comparison. Figure 2 shows a worksheet that would be used for video-footage analysis. Complementing this process, each player can develop a soccer portfolio that contains a series of specific performance-analysis and case-study worksheets, email responses to soccer-related questions, self-assessment questionnaires, goal-setting guides, independent practice plans, match reports, video coverage of individual and team performances, and personal soccer projects. Soccer portfolios document young players’ progress and encourage them to develop a reflective practice.

**Strategies for Questioning**

Success in developing players’ analytical and decision-making skills through PBL activities lies largely in the coach’s ability to turn the team into a learning community, and his or her ability to ask questions that will facilitate guided-discovery methods. Table 1 provides examples of higher-order questioning progressions, using Bloom’s (1956) cognitive taxonomy, which facilitated PBL in the youth soccer academy program.

This detailed framework can be adapted to provide a series of very useful and easy-to-use intervention questions for coaches to enhance PBL. For example, during a small-sided game, a coach may stop the play and ask a specific team, “What sorts of team plays are being made? Why are these happening? What do you think is good about it? What could be done better? How could we practice to improve this aspect of team play?” These questions cause players not only to think about the patterns and causes and
The video showed that we were particularly good at...
For example...
The video showed that we could improve the following aspect of our teamwork...
For example...

I Am the Coach!
Write/Draw/Develop a coaching practice that could improve this aspect of our teamwork.

The video showed that I was particularly good at...
For example...
The video showed that I could improve my... skills
For example...

I Am the Coach!
Write/Draw/Develop a coaching practice that could improve this aspect of your soccer skills.

effects of play, but also encourage them to make judgments and create strategies for future play. Whatever particular game issue is being examined, the questioning strategies in Table 1, ranging from simple (knowledge recall) to complex (evaluation of performance strengths and weaknesses), are valuable for enhancing critical understanding and effective responses to complex game situations at various stages of the PBL process. Furthermore, additional strategies regarding questioning techniques help foster a learning community within the team:

- Establish a positive learning environment with your team (and parents) by being open to suggestion, raising questions, giving praise and support, and striving for improvement.
- Encourage players to generate questions and discuss suggestions among themselves.
- Be open to players’ perspectives and acknowledge player contributions.
- Ask open-ended and progressively higher-order questions, in addition to “success-based” question progressions that probe and challenge players’ understandings and that avoid yes/no responses.
- Allow adequate time for players to think and respond.
- Actively listen to what players are not saying.
- Guide rather than correct or interrupt players’ responses.

By engaging players, parents, and coaches in a learning community, and by drawing on a wide range of authentic learning strategies and abilities, PBL has the potential to enhance team and player development in a youth soccer team. If PBL methodology is a completely new concept for a coach, the coach is strongly advised to begin modestly by introducing and experimenting with a specific activity such as small-sided games during training. This could entail requiring players to formulate a team plan before kick-off, stopping the game after five or ten minutes to ask a series of questions, then requiring each team to reassess their team plan before continuing. Finally, at the end of the first half of play, ask the teams to assess and share their progress before going into the second half of the game, and then repeat the process. A coach might complete the debriefing at the end of the game by asking players to suggest additional practices that might improve the quality of team plays or soccer skills during these games.

Reactions to PBL in a Youth Soccer Program
As time progressed, players in the soccer academy program became more comfortable and less challenged by the initial demands and processes of PBL. This was evident in worksheet responses that became more elaborate in their analysis and development of complex team plays and set-pieces. Players also expressed confident and articulate verbal responses to questions about developing and assessing practices and of...
Table 1. Examples of Higher-Order-Questioning Progressions

- **Knowledge (remember)**—Recall, list, record (the principles of attack and defense, the different types of passes that you can make to a teammate).

- **Comprehension (grasp meanings)**—Provide examples, describe, explain (why did player ‘X’ pass in this situation, how to pass with the inside of your foot).

- **Application (concept-context)**—Provide examples of concepts to practice, calculate, illustrate, demonstrate (the principle of depth when defending as a team, key coaching points when making a long or short pass to a teammate, “Can you think of ways to...? How would you go about...?”).

- **Analysis (codification of whole)**—Classify, summarize, categorize (how this team incorporated principles of attack in this team play, the types of passes that you can make to a teammate).

- **Synthesis (develop parts to whole)**—Integrate, develop, predict (“What will happen if we adopt a man-to-man marking strategy regardless of the play,” develop a small-sided game that requires effective passing to succeed, develop a plan to practice this aspect of defense/offense, “What would happen if...? When do you think is the best time to...?”).

- **Evaluation (value/judge performance)**—Using the principles of attack or defense, how might you judge, compare/contrast the effectiveness (strengths and weaknesses) of our team play in this situation, or the quality of your passing in the video? (“What is happening in this game/practice situation? What are the strengths and weaknesses of this team play/skill execution? How do you know? What questions do you have about this team play? What have we already done that might help us with this offense strategy? What would you change next time? What have you learned? What do you need to do to practice this skill further? How?”)

fensive/defensive strategies. Analysis also revealed better decision-making and coping skills for advanced competition, more assertiveness when calling for the ball during the game, and a higher quality of soccer (flow, complex passing and movement off-the-ball, effective teamwork, and confidence in one another). During team-based video-analysis sessions, players developed a maturity that progressed from, “Oh look, there’s me,” to a broader focus on team and individual strengths and weaknesses and strategies for improvement.

Player and parent feedback suggested that the boys both enjoyed the variety of PBL activities and felt they ranged from “extremely useful” to “very useful” for enhancing team and player development, coach-player interactions, and the “feet-on” experience with the PBL processes. In particular, the way the boys were required to think and make decisions about effective team plays and individual ball skills was valued highly.

Receiving individual feedback was by far the most-valued PBL strategy for these young players. In many cases, coaches provided individual feedback verbally and through team email messages before, during, and after practice or games. Next, young players generally preferred “learning through specific game situations in which they were directly involved.” This included both small-sided games and the peer-coaching activities. This reinforces the motivational value of active PBL methods versus coach-led skills practices, which often yield apathy and comments like, “When are we going to play a game, coach?” Generally, the least popular PBL activities were the independent (versus team-based) assignments that focused on the soccer portfolios, video analysis, reflective observation, and home-based worksheets. Perhaps these activities too closely resembled schoolwork and appeared too distant from learning about soccer in concert with their teammates. Nonetheless, as educators and coaches, we should encourage independent reflection (as well as independent physical practice) as a natural part of team sport development, in order to create analytical players with effective decision-making and problem-solving skills in the team performance environment.

Developing a reflective practice is also a critical skill for lifelong learning (Leamnson, 2000; Schon, 1987).

It was noticeable that the players’ progress with PBL and the cohesion and success of team performances became positively intertwined throughout the eight-month period. This illustrates the need for coaches to set realistic goals for individual and team performances in the context of a progressive, challenging, and success-based PBL environment. The quality of soccer displayed by this youth soccer academy team and the team’s outstanding success in competition was reported in the local media and admired by coaches and parents from around British Columbia. This culminated in an invitation to play against English Premier League Youth Football Academies at Liverpool, Everton and Aston.
Villa, which led to a memorable 13-day overseas soccer field trip to England.

Conclusions
Our research and PBL experiences in a youth soccer program support the notion that young players learn best by being active participants in the team and player development process. Players learn in a variety of ways, start at different stages of development, and progress at different rates; player and team development is both an individual and social contextual process (BC Ministry of Education, 1995).

The PBL strategies in this article were not only effective in solving complex team game and individual skill-acquisition issues in the youth soccer academy, they also accommodated diverse learning styles and the differing abilities and skills of players. The focus on team offensive and defensive situations in small-sided games, and the opportunities provided to individual players to take a leadership role in peer-coaching activities, are examples of how PBL naturally uses inquiry-based learning strategies to enhance team and player development. Problem-based learning activities provided responsive soccer experiences, whereby the recognition of different player strengths (knowledge, abilities, and skills) was also an important ingredient to the cohesion and effectiveness of this youth soccer team.

The soccer academy experience suggests that PBL organizes a coaching program around issues relevant to the team and players; ensures that the practice environment closely simulates the competitive context; engages players as stakeholders in the process of team and player development; engages a player-team-parent-coach community in critical-thinking and problem-solving skills; develops reflective players and fosters an appreciation for games; develops leadership and enhances team and player motivation to improve; and, best of all, enhances soccer performance.

Although this article is based on the experience of PBL conducted in a youth soccer academy program, adaptations demonstrate that PBL is not limited to advanced programs with highly trained coaches and select athletes. Furthermore, the PBL processes described in this soccer context (prior learning assessment, questioning strategies, small-sided games, peer-coaching, video analysis, and player-centred sports portfolios) can also be applied to a broad range of team games in physical education units, such as basketball, hockey, and volleyball.

Problem-based learning strategies, however, are not a panacea for effective team and player development. Problems can arise by poor implementation of PBL (e.g., mismatch of coaching style and poor preparation of players for PBL methodology). To implement effective PBL strategies, a coach requires an eclectic range of progressive, lower-to-higher-order questioning and facilitation techniques (coach-centered to player-centered) to enhance players’ decision-making skills. In addition, coaches need to carefully plan progressively challenging activities and select critical and timely interventions that question understanding and enhance team and player development. Therefore, the additional time required of both coaches and individual athletes to engage in PBL can limit its use.

In summary, PBL strategies are effective at helping young players learn to train, compete as a team, and perform well in competition. As part of a holistic approach to coaching youth players, PBL provides a unique framework to enhance team and player development.

References

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matic. Some assessment tasks may be useful to further test the skill performance before moving to competitive game play. Rink (2002) describes these kinds of assessments as “applications” or self-testing assessments. Examples of these include the number of successful trials partners can achieve consecutively, or the time that two or more performers can continue while executing a certain set of skills with adequate form or process (Rink, 2002). All of these factors change the execution focus from what the body and its parts do (process) to the outcome of the skills (product). This is a step towards competitive play in stage 3. When students exhibit very good performance in these assessment tasks, they are ready for small-group tactical practice in stage 3.

Summary
Combining skills into usable, challenging, and meaningful sequences is often neglected or under-used in many school and community game programs. Combinations of skills build on proficiency in performing separate skills, and they are prerequisite to successful work in more complex game situations involving main attention to tactics, and later to strategy, or systems of tactics. A vital focus on transitions between the skills is recommended when two or more skills are linked in a sequence. The five categories of combining skills can be used to evaluate skill practice and prerequisite skills useful in beginning and even more advanced game forms. A task analysis of the target game or sport in stages 3 and 4 is needed to select sequences of skills for practice in stage 2. The goal is to link these skills into a sequence that can transfer to more complex forms of performance and game play.

References


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